

Territorial Behaviour in British Butterflies

By W. G. SHREEVES*

'The Purple Emperors at Play', described by Major General Lipscomb in the September 1979 issue of the *Entomologist's Record* were almost certainly displaying what is rather loosely defined as 'Territorial Behaviour'. In order to locate a mate butterflies have evolved three basic strategies. Some species use the method known as *patrolling*; that is the males fly almost continuously about the habitat searching for females. The authority on this form of behaviour is C. Wiklund who researched it by following 11 male *Leptidea sinapis* (Wood Whites) for 9 days. A second method involves *long distance pheromones*; here the females attract the males by emitting a type of scent. The third method is known as *perching*; in this case the males spend part of the day sitting on some object while waiting for passing females. The behaviour of Major General Lipscomb's Purple Emperors, which he described as joining in 'a sort of aerial battle', falls into this category. The research in this area has been carried out on *Aglais urticae* (Small Tortoiseshell) and *Inachis io* (Peacock) by R. Baker and on *Pararge aegeria* (Speckled Wood) by N. B. Davies. Hopefully it will gradually be extended to most British species so that we know much more about their behaviour patterns.

Basically the perching method works like this. The males of the species begin by selecting a territory. *P. aegeria* commences as early as 9.00 a.m.; *A. urticae* and *I. io* not until after mid-day. The type of territory varies from species to species. *A. urticae* prefers the vertical edge provided by a hedge or wall; *I. io* also goes for vertical edges but likes rows of trees better; *P. aegeria* selects a sunspot or sunshine pool in a woodland ride or glade and moves as the angle of the sun changes. The common factor in all these territories is that they maximize the male's chance of meeting a female. Within each territory the male then selects his 'perch'. *A. urticae* and *I. io* seem happy to choose a piece of bare earth; *P. aegeria* likes a frond of bracken or a bramble leaf 1 metre high. In a paper written back in 1902 N. H. Joy pointed out that *Apatura iris* (Purple Emperor) favoured a 'throne' in an oak tree.

Once established on his 'territory' the male then proceeds to 'defend' it. Any object passing overhead and roughly of the appropriate size of that species is 'investigated'. The males are sometimes so anxious that they are not too fussy about what they investigate. I have even received well authenticated reports of *Vanessa atalanta* (Red Admiral) flying off its perch to inspect a Kestrel which was hovering about 3 metres off the ground! When the investigation has proved that the intruder is of an alien species the 'owner' of the territory returns to his perch. However if the intruder is another male

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of the owner's species a 'tournament' commences. Each species appears to have evolved its own set of rules. In the case of *P. aegeria* both individuals spiral vertically upwards seeming to bump into each other. After a while one returns to perch in the sunspot and the other disappears into the canopy of trees above. *A. urticae* and *I. io* behave in a similar manner. The resident male intercepts the intruder and together the pair spiral upwards, each male trying to achieve and maintain a position slightly behind and above the other. Rather like a World War II fighter pilot, the 'loser' then breaks off the action and goes into a series of dives to try to shake off his opponent. Eventually a 'winner' returns to the territory and resumes his perch. In the majority of cases the winner is the original owner of the territory. As N. B. Davies remarks in his article, the intruder is in effect saying, 'Sorry I didn't know there was anyone occupying the sunspot, I'll retreat back into the canopy'. But suppose the owner of the territory had flown off for a moment or failed to notice the intruder before he found a perch? In that case the friendly 'tournament' turns into something more like a 'battle' because both males regard themselves as the owners. N. B. Davies provoked several of these battles artificially by smuggling in an intruder male *P. aegeria*. The resulting spiral combats might last up to ten times as long as the normal polite 'tournament'. R. Baker found that the winner of these 'battles' was usually the male who could navigate his way back to the original territory despite the violent twists and turns of the combat flight. Normally this was the original owner; presumably he had begun to know the position of his territory. However,, in a smaller percentage of cases the intruder might succeed in finding his way back. In that case further battles commenced and, if the intruder managed to come back at least twice more, he then had a reasonable chance of emerging the 'winner'. Unless they lose one of these conflicts, male *P. aegeria* seem to stay on the same sunspot for most of the day, ending their vigil around 15.00 hours. *I. io* stays at his post throughout the afternoon. *A. urticae*, however, is likely to change his territory at least once. Of course the arrival of a female on the scene provokes the usual courtship behaviour typical to each species.

It should be clear from this that what Major General Lipscomb witnessed was a rather exceptional territorial battle involving perhaps two adjacent *A. iris* territories and two intruders. As far as I know *Quercusia quercus* (Purple Hair-streak) has not been researched but it seems very likely that this species too is a 'percher'. In which case the general activity would have triggered off the *quercus* males into inspection flights, thus adding to the general confusion. There is no doubt that research into this area of behaviour is both fascinating and important. If the Naturalists' Trusts are to succeed in setting up properly managed conservation areas where our less common species can be preserved they need all the infor-

mation they can get about the territorial requirements of butterflies. With this object in view I have spent three years attempting to study the mate-locating behaviour of *Hamearis lucina* (The Duke of Burgundy Fritillary). It is too early yet to make firm conclusions but there is no doubt that the species is a 'percher'. In its woodland habitat, where the larva feeds on primroses, the males occupy territories at path intersections and choose perches in grass, nettles or dwarf shrubs. They behave in much the same way as the other butterflies already researched; they make investigation flights, engage in tournaments and battles with other males. They do, however, seem to remain on the same territory from 10.00 hours to 15.00 hours and a high proportion re-appear on the same territory several days in succession. A downland colony, on the other hand, where the larval food plant is cowslip, seems to be showing significant variations. The males choose territories which are packed very close together with the result that there are many more tournaments and battles than in the woodland colony. If there are any entomologists who know this species well I should welcome comments from them on any characteristics of behaviour they have observed.

References

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ABNORMAL ABUNDANCE OF VANESSA ATALANTA L. IN SOUTH DEVON. — At the end of September and for the first few days of October 1980, my wife and I had a brief holiday in S. Devon near Bolt Head. While we were there we couldn't help noticing the remarkable numbers of Red Admirals that were everywhere along the coast. My first came to our notice when, soon after our arrival, I counted thirty on a patch of ivy blossom near our hotel. They proved to be equally common all along the coast from Start Point to Bantham on the river Avon Estuary, the coastal limits of our wanderings.

The butterflies were very fresh and I am certain were the result of a big local emergence, particularly as full fed larvae and pupae could be found readily on local nettle patches. I even picked up a recently hatched cripple crawling about on the cliff path. Apart from the Red Admirals no other butterflies were represented by more than a few odd individuals.

Here in Wiltshire this autumn I have seen no Red Admirals at all on the flowers in my garden although these have been well patronised by Small Tortoiseshells and a few Painted Ladies. — Major General C. G. LIPSCOMB, The Riding, Knook, Warminster, Wiltshire.